"Mathematics is a game played according to certain simple rules with meaningless marks on paper."

- David Hilbert
9.4 Arcs and Chords

In the same circle, or in congruent circles, two minor arcs are congruent if and only if their corresponding chords are congruent.

\[ \widehat{AB} \cong \widehat{CD} \text{ if and only if } AB \cong CD. \]

If a diameter of a circle is perpendicular to a chord, then the diameter bisects the chord and its arc.

In the same circle, or in congruent circles, two chords are congruent if and only if they are equidistant from the center.

\[ AB \cong CD \text{ if and only if } EF = EG. \]
Practice:

1. In the diagram of $\odot F$, $AB = CD = 12$. Find $EF$.

   $\begin{align*}
   7x - 8 &= 3x \\
   -8 &= -4x \\
   2 &= x \\
   \end{align*}$

   $EF = 6$

2. Find the measures of $\widehat{CB}$, $\widehat{BE}$, and $\widehat{CE}$.

   $4x = 80 - x$

   $5x = 80$

   $x = 16$
3. In circle $O$ with radius 12 cm and chord $RS$ 6 cm from $O$. Find $RS$.

$\triangle ABC$ is a 30-60-90 triangle.

$RS = 12\sqrt{3}$
4. Find $EB$

\[
\frac{10 \cdot \sqrt{2}}{\sqrt{135}} = \frac{10\sqrt{2}}{2} = 5\sqrt{2}
\]

$EB = 10 - 5\sqrt{2}$
5.

Find $m\overline{CD}$

$\overline{AB} \cong \overline{CD}$

$\overline{AB} \cong \overline{CD}$
Homework:
pg. 347, 348: 1-22 (omit 15, 16) (wr)